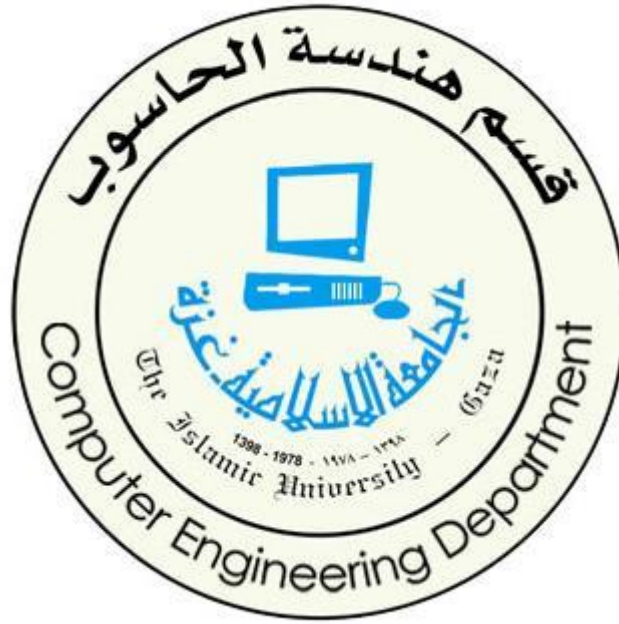




"Probability Theory & Statistics"

Mid Exam 2025

"شكر خاص لكل المساهمين في الملف"

Prepared by:

Computer Engineering Group Team [2004]

<https://t.me/IUGComENG2004>



Question 1

Not yet
answered

Marked out of 3

Flag question

Mobile phone calls involve handoffs (H_0 : zero, H_1 : one, H_2 : >one) and are Long (L) or Brief (B). The joint probabilities are: $P(L, H_0)=0.1$, $P(L, H_1)=0.1$, $P(L, H_2)=0.2$; $P(B, H_0)=0.4$, $P(B, H_1)=0.1$, $P(B, H_2)=0.1$. What is $P[\text{call is Long} \mid \text{it had exactly one handoff } (H_1)]$?

- ☐ a. 0.2
- ☐ b. 0.5
- ☐ c. 0.1
- ☐ d. none
- ☐ e. 0.25

You roll a fair six-sided die once. What is the probability that the roll results in an odd number?

- ☐ a. none
- ☐ b. $1/3$
- ☐ c. $2/3$
- ☐ d. $1/6$
- ☐ e. $1/2$

Gerlanda's pizza offers Tuscan (T) and Neapolitan (N) crusts. They also offer mushrooms (M) as a topping. Assuming standard pizza options where a crust type does not inherently exclude a topping, can a pizza be both Neapolitan (N) and have mushrooms (M)?

- ☐ a. No, crust type and toppings are always mutually exclusive.
- ☐ b. none
- ☐ c. Only if $P(N \text{ and } M) > 0$ is explicitly stated as true.
- ☐ d. Yes, but only if it's also Tuscan.
- ☐ e. Yes, a Neapolitan pizza can typically have mushrooms.

In a binary code with 5 bits, each bit is a zero with a probability of 0.8, and thus a one with a probability of 0.2. The value of each bit is independent of the other bits. What is the probability of observing the specific code word '10100'?

- ☐ a. $(0.5)^5$
- ☐ b. $(0.2)^2 * (0.8)^3$
- ☐ c. $(0.8)^2 * (0.2)^3$
- ☐ d. none
- ☐ e. $(5 \text{ choose } 2) * (0.2)^2 * (0.8)^3$

In Mendel's peas, yellow seed color (y) is dominant over green seed color (g). Thus, a pea plant with genes yy or yg or gy will have yellow seeds, while a plant with gg genes will have green seeds. If two first-generation hybrid plants (each with 'gy' genes) are crossbred, and each parent plant is equally likely to pass on either its 'g' or 'y' gene, what is the probability that a second-generation offspring plant will have green seeds?

- ☐ a. 1/2
- ☐ b. none
- ☐ c. 3/4
- ☐ d. 0
- ☐ e. 1/4

Cellular phones are classified as Handheld (H) or Mobile (M). Calls are classified by speed as Fast (F) or Slow (W). Given $P[F]=0.5$, $P[\text{Handheld and Fast, HF}]=0.2$, $P[\text{Mobile and Slow, MW}]=0.1$. What is $P[MF]$, the probability a call is Mobile AND Fast?

- ☐ a. 0.2
- ☐ b. 0.3
- ☐ c. 0.1
- ☐ d. 0.4
- ☐ e. none

Consider a language containing 4 distinct letters: A, B, C, D. How many different three-letter words can be formed if each letter can appear only once in each word (i.e., no repetition of letters within a word)?

- ☐ a. none
- ☐ b. 64
- ☐ c. 24
- ☐ d. 4
- ☐ e. 12

A system consists of 2 components connected in parallel. Component 1 works with a probability $P[W1]=0.7$. Component 2 works with a probability $P[W2]=0.6$. The components work independently. What is the probability that the entire system works?

- ☐ a. none
- ☐ b. 0.6
- ☐ c. 0.88
- ☐ d. 0.7
- ☐ e. 0.42

A student's score on a 10-point quiz is equally likely to be any integer from 0 to 10 (inclusive, resulting in 11 distinct possibilities). A score less than 4 is an F. What is the probability the student gets an F?

- ☐ a. 3/11
- ☐ b. 3/10
- ☐ c. none
- ☐ d. 4/10
- ☐ e. 4/11

Mobile phone calls involve handoffs (H0: zero, H1: one, H2: >one) and are Long (L) or Brief (B). The joint probabilities are: $P(L, H0)=0.1$, $P(L, H1)=0.1$, $P(L, H2)=0.2$; $P(B, H0)=0.4$, $P(B, H1)=0.1$, $P(B, H2)=0.1$. What is $P[H0]$ (the probability a randomly selected call makes no handoffs)?

- ☐ a. 0.4
- ☐ b. 0.5
- ☐ c. 0.6
- ☐ d. none
- ☐ e. 0.1

Q1: $P[L|H_1] = \frac{P[LH_1]}{P[H_1]} = \frac{0.1}{P[LH_1] + P[BH_1]} = \frac{0.1}{0.2} = 0.5$

Q2: $S = \{1, 2, 3, 4, 5, 6\}$
 event (odd) = $\{1, 3, 5\}$ $P[\text{odd}] = \frac{3}{6} = \frac{1}{2}$

Q3: (T or N), (M or N) independent
 so: yes, a Neapolitan Pizza Can have mushrooms.

Q4: $0.2, 1, 0.8, 0$
 $P[10100] = 0.2 \times 0.8 \times 0.2 \times 0.8 \times 0.8 = (0.2)^2 (0.8)^3 \#$

Q5: $gy \times gy$ $P[gg] = \frac{1}{4}$ (green seeds $\therefore gg$)

Q6: $P[MF] = ??$
 $P[F] = P[HF] + P[MF] \rightarrow P[MF] = 0.5 - 0.2 = 0.3$

Q7: $\{A, B, C, D\}$ word from 3 letter $\square \square \square$
 can appear only once = $4 \times 3 \times 2 = 24$

Q8: $P[A_1] = 0.7$, $P[A_2] = 0.6$
 $P[\text{Both Component fail}] = (1 - 0.7) \times (1 - 0.6) = 0.3 \times 0.4 = 0.12$
 $P[\text{system work}] = 1 - P[\text{Both fail}] = 1 - 0.12 = 0.88$

Q9: $S = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 event $\{< 4\} = \{0, 1, 2, 3\} \rightarrow P[\text{Event}] = \frac{4}{11} \#$

Q10: $P[H_0] = P[LH_0] + P[BH_0] = 0.1 + 0.4 = 0.5$

نظرية احتمالات وإحصاء

Question 10

Not yet answered

Marked out of 3

Flag question

You are dealt a 3-card hand from a standard 52-card deck. There are 12 face cards (Jack, Queen, King) in the deck. What is the probability that your 3-card hand consists entirely of face cards?

- ☐ a. $(12 \text{ choose } 3) / (52 \text{ choose } 3)$
- ☐ b. $(12/52)^3$
- ☐ c. none
- ☐ d. $(12 \text{ choose } 3) / 52^3$
- ☐ e. $(12 \times 11 \times 10) / (52 \times 51 \times 50)$

الصفحة التالية

نظرية احتمالات وإحصاء

Question 7

Not yet answered

Marked out of 3

Flag question

Mobile phone calls involve handoffs (H_0 : zero, H_1 : one, H_2 : >one) and are Long (L) or Brief (B). The joint probabilities are: $P(L, H_0)=0.1$, $P(L, H_1)=0.1$, $P(L, H_2)=0.2$; $P(B, H_0)=0.4$, $P(B, H_1)=0.1$, $P(B, H_2)=0.1$. What is $P[H_0]$ (the probability a randomly selected call makes no handoffs)?

- ☐ a. 0.6
- ☐ b. 0.1
- ☐ c. 0.5
- ☐ d. none
- ☐ e. 0.4

الصفحة التالية

نظرية احتمالات وإحصاء

Question 9

Not yet answered

Marked out of 3

Flag question

In 3 independent Bernoulli trials, the probability of success (outcome '1') in any single trial is $p=0.25$. What is the probability of observing exactly one success in these 3 trials?

- ☐ a. none
- ☐ b. 3×0.25
- ☐ c. $(3 \text{ choose } 1) \cdot (0.25)^1 \cdot (0.75)^2$
- ☐ d. $(3 \text{ choose } 1) \cdot (0.25)^2 \cdot (0.75)^1$
- ☐ e. $(0.25) \cdot (0.75)^2$

الصفحة التالية

نظرية احتمالات وإحصاء

Question 4

Not yet answered

Marked out of 3

Flag question

Events A and B form a partition of the sample space S (meaning they are mutually exclusive and their union is S, so $P[A] + P[B] = 1$). If $P[A] = 2P[B]$, what is the probability of event A, $P[A]$?

- ☐ a. $3/4$
- ☐ b. $1/3$
- ☐ c. $2/3$
- ☐ d. none
- ☐ e. $1/2$

الصفحة التالية

نظرية احتمالات وإحصاء

Question 6

Not yet answered

Marked out of 3

Flag question

A system consists of 2 components connected in series. Component 1 works with a probability $P[W1]=0.9$. Component 2 works with a probability $P[W2]=0.8$. The components work independently. What is the probability that the entire system works?

- ☐ a. 0.9
- ☐ b. 0.98
- ☐ c. 0.8
- ☐ d. 0.72
- ☐ e. none

الصفحة التالية

نظرية احتمالات وإحصاء

Question 5

Not yet answered

Marked out of 3

Flag question

Cellular phones are classified as Handheld (H) or Mobile (M). Calls are classified by speed as Fast (F) or Slow (W). Given $P[F]=0.5$, $P[\text{Handheld and Fast, HF}]=0.2$, $P[\text{Mobile and Slow, MW}]=0.1$. What is $P[MF]$, the probability a call is Mobile AND Fast?

- ☐ a. 0.2
- ☐ b. none
- ☐ c. 0.1
- ☐ d. 0.3
- ☐ e. 0.4

الصفحة التالية

نظرية احتمالات وإحصاء

Question 8

Not yet answered

Marked out of 3

Flag question

In a binary code with 5 bits, each bit is a zero with a probability of 0.8, and thus a one with a probability of 0.2. The value of each bit is independent of the other bits. What is the probability of observing the specific code word '10100'?

- ☐ a. $(0.2)^2 * (0.8)^3$
- ☐ b. $(5 \text{ choose } 2) * (0.2)^2 * (0.8)^3$
- ☐ c. none
- ☐ d. $(0.8)^2 * (0.2)^3$
- ☐ e. $(0.5)^5$

الصفحة التالية

نظرية احتمالات وإحصاء

Question 1

Not yet answered

Marked out of 3

Flag question

Mobile phone calls involve handoffs (H_0 : zero, H_1 : one, H_2 : >one) and are Long (L) or Brief (B). The joint probabilities are: $P(L, H_0)=0.1$, $P(L, H_1)=0.1$, $P(L, H_2)=0.2$; $P(B, H_0)=0.4$, $P(B, H_1)=0.1$, $P(B, H_2)=0.1$. What is $P[\text{call is Long} \mid \text{it had exactly one handoff } (H_1)]$?

- ☐ a. 0.2
- ☐ b. none
- ☐ c. 0.25
- ☐ d. 0.5
- ☐ e. 0.1

الصفحة التالية

نظرية احتمالات وإحصاء

Question 2

Not yet answered

Marked out of 3

Flag question

Computer programs are classified by length as Big (B) or Little (L), and by execution time as Fast (F) or Slow (W). The following probabilities are known: $P[\text{Little and Fast, LF}] = 0.5$, $P[\text{Big and Fast, BF}] = 0.2$, $P[\text{Big and Slow, BW}] = 0.2$. Assuming these are the only categories (so probabilities sum to 1), what is $P[L]$, the probability a randomly selected program is Little?

- ☐ a. 0.5
- ☐ b. 0.7
- ☐ c. 0.6
- ☐ d. 0.8
- ☐ e. none

الصفحة التالية

نظرية احتمالات وإحصاء

Question 3

Not yet answered

Marked out of 3

Flag question

From a group of 4 distinct people, how many different committees consisting of exactly 2 people can be formed?

- ☐ a. none
- ☐ b. 12
- ☐ c. 6
- ☐ d. 4
- ☐ e. 8

الصفحة التالية

question 5

$$P(F) = 0.5$$

$$P(H \text{ and } F) = 0.2$$

$$P(M \text{ and } W) = 0.1$$

$$P(MF) = ?!$$

$$P(F) = \underbrace{P(HF)} + P(MF)$$

$$P(MF) = P(F) - P(HF) \Rightarrow 0.5 - 0.2 = \boxed{0.3}$$

question 6

system is series.

Component 1 works $P(W_1) = 0.9$

" 2 $P(W_2) = 0.8$

Components work independently.

$$P(\text{system works}) = P(W_1 \text{ and } W_2)$$

$$= P(W_1) \cdot P(W_2)$$

$$= 0.9 \times 0.8$$

$$= \boxed{0.72}$$

question 7.

$$P(L, H_0) = 0.1$$

$$P(L, H_1) = 0.1$$

$$P(L, H_2) = 0.2$$

$$P(B, H_0) = 0.4$$

$$P(B, H_1) = 0.1$$

$$P(B, H_2) = 0.1$$

$$P(H_0) = ?!$$

$$P(L, H_0) + P(B, H_0)$$

$$0.1 + 0.4$$

$$= \boxed{0.5}$$

question 8

$$P(0) = 0.8$$

$$P(1) = 0.2$$

Bits are independent

The code word is "1 0 1 0 0", so the probability is:

$$P(1) \times P(0) \times P(1) \times P(0) \times P(0)$$

$$= 0.2 \times 0.8 \times 0.2 \times 0.8 \times 0.8$$

$$= \boxed{(0.2)^2 \cdot (0.8)^3}$$

$$= \boxed{0.02048}$$

Question 9

$$n = 3$$

$$k = 1$$

$$p = 0.25$$

$$P(X=1) = \binom{3}{1} (0.25)^1 (0.75)^2$$

Question 10

The total number of Possible 3 card hand is: $\binom{52}{3}$

The number of ways to select 3 face cards out of the 12 available face cards is: $\binom{12}{3}$

The required Probability:

$$P = \frac{\binom{12}{3}}{\binom{52}{3}}$$

#

question 1

$$P(\text{long and } H_1) = 0.1$$

$$P(\text{Brief and } H_1) = 0.1$$

$$P(H_1) = P(\text{long and } H_1) + P(\text{Brief and } H_1)$$

$$= 0.1 + 0.1 = \boxed{0.2}$$

$$P(\text{long} | H_1) = \frac{P(\text{long and } H_1)}{P(H_1)} = \frac{0.1}{0.2} = \boxed{0.5}$$

question 2

$$P(LF) = 0.5$$

little and fast

$$P(BF) = 0.2$$

Big and fast

$$P(BW) = 0.2$$

Big and slow

$$P(LW) = 1 - [P(LF) + P(BF) + P(BW)]$$

$$= 1 - [0.5 + 0.2 + 0.2] = \boxed{0.1}$$

$$P(L) = P(LF) + P(LW)$$

$$= 0.5 + 0.1$$

$$= \boxed{0.6}$$

Question 3

بأنه

ترتيب الأشخاص داخل اللجنة لا يهم، فنستخدم التوافيق وليس التباديل.

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

$n = 4$ (total People)

$r = 2$ (People per committee)

$$\binom{4}{2} = \frac{4!}{2!(4-2)!} = \frac{4 \times 3 \times 2 \times 1}{2 \times 1 \times 2 \times 1} = \frac{24}{4} = \boxed{6}$$

Question 4

$$P(A) + P(B) = 1$$

$$P(A) = 2P(B)$$

$$P(B) = x \quad \text{نسبة A}$$

$$P(A) = 2x$$

نسبة B

$$P(A) + P(B) = 1 \Rightarrow \begin{array}{l} 2x + x = 1 \\ 3x = 1 \end{array} \Rightarrow \boxed{x = \frac{1}{3}}$$

$$P(A) = 2x = 2 \times \frac{1}{3} = \boxed{\frac{2}{3}}$$

منه
النتيجة

نظرية اح

Consider a binary code where each code word consists of 4 bits (each bit being either 0 or 1). How many different 4-bit code words are possible?

- ☐ a. 8
- ☐ b. none
- ☐ c. 4
- ☐ d. 16
- ☐ e. 32

الصفحة التالية

نظرية

Consider an experiment that observes Wi-Fi transmission characteristics. The speed can be high (h), medium (m), or low (l), and the signal length can be for a mouse click (c) or a tweet (t). An observation is a two-letter word representing speed then length (e.g., hm for high-speed mouse click). Which of the following represents the complete sample space S for this experiment?

- ☐ a. $S = \{hc, mt, lc, ht, mc, lt\}$
- ☐ b. none
- ☐ c. $S = \{(h,c), (h,t), (m,c), (m,t), (l,c), (l,t)\}$
- ☐ d. $S = \{h, m, l\} \cup \{c, t\}$
- ☐ e. $S = \{h, m, l, c, t\}$

الصفحة التالية

نظرية ١

A Starburst package contains 12 individual candy pieces. Each piece is equally likely to be Berry, Orange, Lemon, or Cherry (4 distinct flavors), and the flavor of each piece is independent of the others. What is the probability that a randomly selected package has no Orange pieces?

- ☐ a. none
- ☐ b. $1-(1/4)^{12}$
- ☐ c. $(3/4)^{12}$
- ☐ d. $(1/4)^{12}$
- ☐ e. $(1/2)^{12}$

الصفحة التالية

نظرية احتمالات

You are dealt a 3-card hand from a standard 52-card deck. There are 12 face cards (Jack, Queen, King) in the deck. What is the probability that your 3-card hand consists entirely of face cards?

- ☐ a. $(12 \times 11 \times 10) / (52 \times 51 \times 50)$
- ☐ b. $(12/52)^3$
- ☐ c. $(12 \text{ choose } 3) / 52^3$
- ☐ d. $(12 \text{ choose } 3) / (52 \text{ choose } 3)$
- ☐ e. none

الصفحة التالية

نظرية احتمالات

5

1 of 3
question

A system consists of 2 components connected in series. Component 1 works with a probability $P[W1]=0.9$. Component 2 works with a probability $P[W2]=0.8$. The components work independently. What is the probability that the entire system works?

- ☐ a. 0.9
- ☐ b. 0.72
- ☐ c. 0.98
- ☐ d. 0.8
- ☐ e. none

الصفحة التالية

نظرية احتمالات

In Mendel's peas, yellow seed color (y) is dominant over green seed color (g). Thus, a pea plant with genes yy or yg or gy will have yellow seeds, while a plant with gg genes will have green seeds. If two first-generation hybrid plants (each with 'gy' genes) are crossbred, and each parent plant is equally likely to pass on either its 'g' or 'y' gene, what is the probability that a second-generation offspring plant will have green seeds?

- ☐ a. none
- ☐ b. $3/4$
- ☐ c. $1/4$
- ☐ d. $1/2$
- ☐ e. 0

الصفحة التالية

نظرية احتمالا

3
in

If events C and D are known to be independent events, are their complements, C^c and D^c , also independent?

- ☐ a. Yes, always.
- ☐ b. Only if C and D are mutually exclusive.
- ☐ c. No, never.
- ☐ d. none
- ☐ e. Only if $P[C] = P[D]$.

الصفحة التالية

نظرية الاحتمال

You shuffle a standard 52-card deck and turn over the first card. How many distinct outcomes are in the event that the first card drawn is a King?

- ☐ a. none
- ☐ b. 13
- ☐ c. 4
- ☐ d. 1
- ☐ e. 52

الصفحة التالية

نظرية احتمال

3
on

Events A and B form a partition of the sample space S (meaning they are mutually exclusive and their union is S, so $P[A] + P[B] = 1$). If $P[A] = 2P[B]$, what is the probability of event A, $P[A]$?

- ☐ a. $1/3$
- ☐ b. none
- ☐ c. $2/3$
- ☐ d. $1/2$
- ☐ e. $3/4$

الصفحة التالية

نظرية الاحتمال

Cellular phones are classified as Handheld (H) or Mobile (M). Calls are classified by speed as Fast (F) or Slow (W). Given $P[F]=0.5$, $P[\text{Handheld and Fast, HF}]=0.2$, $P[\text{Mobile and Slow, MW}]=0.1$. What is $P[MF]$, the probability a call is Mobile AND Fast?

- ☐ a. 0.4
- ☐ b. none
- ☐ c. 0.3
- ☐ d. 0.2
- ☐ e. 0.1

الصفحة التالية

Question 3

Not yet answered

Marked out of 3

🚩 Flag question

In an experiment observing Wi-Fi transmission speed (h: high, m: medium, l: low) and signal length (c: mouse click, t: tweet), let A1 be the event "medium speed connection." Which set of outcomes corresponds to event A1?

- ☐ a. none
- ☒ b. $\{(m,c), (m,t)\}$
- ☐ c. $\{m\}$
- ☐ d. $\{(h,m), (m,m), (l,m)\}$
- ☐ e. $\{(m,c)\}$

Three machines, X, Y, and Z, each produce one circuit. Each circuit is tested and found to be either acceptable (a) or to fail (f). An observation is a sequence of three test results, corresponding to the circuits from machines X, Y, and Z respectively (e.g., 'aaf'). Let Z_F be the event {the circuit from machine Z fails} and X_A be the event {the circuit from machine X is acceptable}. Are events Z_F and X_A mutually exclusive?

- ☐ a. Yes, because a circuit from Z cannot be from X.
- ☐ b. none
- ☐ c. Yes, because one event is about failure and the other about acceptance.
- ☐ d. No, because an outcome like 'a f f' (X acceptable, Y fails, Z fails) is in both X_A and Z_F.
- ☐ e. Only if all circuits from machine X fail.

Question 5

Not yet answered

Marked out of 3

🚩 Flag question

Cellular phones are classified as Handheld (H) or Mobile (M). Calls are classified by speed as Fast (F) or Slow (W). Given $P[F]=0.5$, $P[\text{Handheld and Fast, HF}]=0.2$, $P[\text{Mobile and Slow, MW}]=0.1$. What is $P[MF]$, the probability a call is Mobile AND Fast?

- ☐ a. 0.1
- ☐ b. 0.4
- ☒ c. 0.3
- ☐ d. 0.2
- ☐ e. none

Question 6

Not yet answered

Marked out of 3

🚩 Flag question

In a binary code with 5 bits, each bit is a zero with a probability of 0.8, and thus a one with a probability of 0.2. The value of each bit is independent of the other bits. What is the probability of observing the specific code word '10100'?

- ☐ a. $(0.8)^2 * (0.2)^3$
- ☐ b. $(0.2)^2 * (0.8)^3$
- ☐ c. $(5 \text{ choose } 2) * (0.2)^2 * (0.8)^3$
- ☐ d. none
- ☐ e. $(0.5)^5$

Question 7

Not yet answered

Marked out of 3

🚩 Flag question

Consider a binary code where each code word consists of 4 bits (each bit being either 0 or 1). How many different 4-bit code words are possible?

- ☐ a. 16
- ☐ b. 8
- ☐ c. 4
- ☐ d. none
- ☐ e. 32

Question 8

Not yet answered

Marked out of 3

🚩 Flag question

In Mendel's peas, yellow seed color (y) is dominant over green seed color (g). Thus, a pea plant with genes yy or yg or gy will have yellow seeds, while a plant with gg genes will have green seeds. If two first-generation hybrid plants (each with 'gy' genes) are crossbred, and each parent plant is equally likely to pass on either its 'g' or 'y' gene, what is the probability that a second-generation offspring plant will have green seeds?

- ☐ a. 3/4
- ☐ b. 1/4
- ☐ c. 0
- ☐ d. none
- ☐ e. 1/2

Question 10

Not yet answered

Marked out of 3

🚩 Flag question

You are dealt a 3-card hand from a standard 52-card deck. There are 12 face cards (Jack, Queen, King) in the deck. What is the probability that your 3-card hand consists entirely of face cards?

- ☐ a. none
- ☐ b. $(12 \text{ choose } 3) / 52^3$
- ☐ c. $(12 \text{ choose } 3) / (52 \text{ choose } 3)$
- ☐ d. $(12/52)^3$
- ☐ e. $(12 \times 11 \times 10) / (52 \times 51 \times 50)$

If events C and D are known to be independent events, are their complements, C^c and D^c , also independent?

- ☐ a. none
- ☐ b. Only if $P[C] = P[D]$.
- ☐ c. Yes, always.
- ☐ d. Only if C and D are mutually exclusive.
- ☐ e. No, never.

Question 8

Not yet answered

Marked out of 3

Flag question

In Mendel's peas, yellow seed color (y) is dominant over green seed color (g). Thus, a pea plant with genes yy or yg or gy will have yellow seeds, while a plant with gg genes will have green seeds. If two first-generation hybrid plants (each with 'gy' genes) are crossbred, and each parent plant is equally likely to pass on either its 'g' or 'y' gene, what is the probability that a second-generation offspring plant will have green seeds?

- ☐ a. $3/4$
- ☒ b. $1/4$
- ☐ c. 0
- ☐ d. none
- ☐ e. $1/2$

A Starburst package contains 12 individual candy pieces. Each piece is equally likely to be Berry, Orange, Lemon, or Cherry (4 distinct flavors), and the flavor of each piece is independent of the others. What is the probability that a randomly selected package has no Orange pieces?

- ☐ a. $(1/2)^{12}$
- ☐ b. $(1/4)^{12}$
- ☒ c. $(3/4)^{12}$
- ☐ d. none
- ☐ e. $1-(1/4)^{12}$

Question 9

Not yet answered

Marked out of 3

Flag question

Mobile phone calls involve handoffs (H_0 : zero, H_1 : one, H_2 : >one) and are Long (L) or Brief (B). The joint probabilities are: $P(L, H_0)=0.1$, $P(L, H_1)=0.1$, $P(L, H_2)=0.2$; $P(B, H_0)=0.4$, $P(B, H_1)=0.1$, $P(B, H_2)=0.1$. What is $P[H_0]$ (the probability a randomly selected call makes no handoffs)?

- ☐ a. 0.6
- ☐ b. 0.1
- ☒ c. 0.5
- ☐ d. 0.4
- ☐ e. none

A Starburst package contains 12 individual candy pieces. Each piece is equally likely to be Berry, Orange, Lemon, or Cherry (4 distinct flavors), and the flavor of each piece is independent of the others. What is the probability that a randomly selected package has no Orange pieces?

- ☐ a. $(1/4)^{12}$
- ☐ b. $(1/2)^{12}$
- ☐ c. none
- ☐ d. $1-(1/4)^{12}$
- ☐ e. $(3/4)^{12}$

Question 9

Not yet answered

Marked out of 3

🚩 Flag question

Consider a binary code where each code word consists of 4 bits (each bit being either 0 or 1). How many different 4-bit code words are possible?

- ☐ a. 16
- ☐ b. 8
- ☐ c. none
- ☐ d. 32
- ☐ e. 4

Question 8

Not yet answered

Marked out of 3

🚩 Flag question

Gerlanda's pizza offers Tuscan (T) and Neapolitan (N) crusts. They also offer mushrooms (M) as a topping. Assuming standard pizza options where a crust type does not inherently exclude a topping, can a pizza be both Neapolitan (N) and have mushrooms (M)?

- ☐ a. Yes, but only if it's also Tuscan.
- ☐ b. none
- ☐ c. Only if $P(N \text{ and } M) > 0$ is explicitly stated as true.
- ☐ d. No, crust type and toppings are always mutually exclusive.
- ☐ e. Yes, a Neapolitan pizza can typically have mushrooms.

Question 7

Not yet answered

Marked out of 3

🚩 Flag question

In 3 independent Bernoulli trials, the probability of success (outcome '1') in any single trial is $p=0.25$. What is the probability of observing exactly one success in these 3 trials?

- ☐ a. none
- ☐ b. 3×0.25
- ☐ c. $(3 \text{ choose } 1) \cdot (0.25)^2 \cdot (0.75)^1$
- ☐ d. $(3 \text{ choose } 1) \cdot (0.25)^1 \cdot (0.75)^2$
- ☐ e. $(0.25) \cdot (0.75)^2$

Question 6

Not yet answered

Marked out of 3

🚩 Flag question

Consider an experiment that observes Wi-Fi transmission characteristics. The speed can be high (h), medium (m), or low (l), and the signal length can be for a mouse click (c) or a tweet (t). An observation is a two-letter word representing speed then length (e.g., hm for high-speed mouse click). Which of the following represents the complete sample space S for this experiment?

- ☐ a. $S = \{hc, mt, lc, ht, mc, lt\}$
- ☐ b. $S = \{h, m, l\} \text{ union } \{c, t\}$
- ☐ c. none
- ☐ d. $S = \{h, m, l, c, t\}$
- ☐ e. $S = \{(h,c), (h,t), (m,c), (m,t), (l,c), (l,t)\}$

Question 5

Not yet answered

Marked out of 3

🚩 Flag question

You flip a biased coin twice. On any given flip, the probability of getting Heads (H) is $\frac{1}{3}$. The flips are independent. What is the probability of getting the sequence Tails then Heads (TH)?

- ☐ a. $\frac{2}{9}$
- ☐ b. none
- ☐ c. $\frac{1}{3}$
- ☐ d. $\frac{4}{9}$
- ☐ e. $\frac{1}{9}$

Question 4

Not yet answered

Marked out of 3

🚩 Flag question

In an experiment observing Wi-Fi transmission speed (h: high, m: medium, l: low) and signal length (c: mouse click, t: tweet), let A_1 be the event "medium speed connection." Which set of outcomes corresponds to event A_1 ?

- ☐ a. $\{m\}$
- ☐ b. $\{(m,c), (m,t)\}$
- ☐ c. $\{(h,m), (m,m), (l,m)\}$
- ☐ d. none
- ☐ e. $\{(m,c)\}$

Question 3

Not yet answered

Marked out of 3

🚩 Flag question

If events C and D are known to be independent events, are their complements, C^c and D^c , also independent?

- ☐ a. Only if $P[C] = P[D]$.
- ☐ b. Yes, always.
- ☐ c. none
- ☐ d. Only if C and D are mutually exclusive.
- ☐ e. No, never.

Question 2

Not yet answered

Marked out of 3

🚩 Flag question

A basketball player takes two free throws. The probability of making the first free throw is $1/2$. If the first free throw is made, the probability of making the second is $3/4$. If the first free throw is missed, the probability of making the second is $1/4$. What is the probability the player makes both free throws?

- ☐ a. $1/8$
- ☐ b. $3/8$
- ☐ c. $1/4$
- ☐ d. none
- ☐ e. $1/2$

Question 1

Not yet answered

Marked out of 3

🚩 Flag question

From a group of 4 distinct people, how many different committees consisting of exactly 2 people can be formed?

- ☐ a. 4
- ☐ b. none
- ☐ c. 8
- ☐ d. 12
- ☐ e. 6

نظرية احتمالات وإحصاء

Question 1

Not yet answered

Marked out of 3

🚩 Flag question

You have two biased coins, Coin A ($P[\text{Heads}] = 1/4$) and Coin B ($P[\text{Heads}] = 3/4$). You are not sure which is which, so you choose one coin at random ($P[A \text{ chosen}] = P[B \text{ chosen}] = 1/2$) and flip it. The flip results in Heads. What is the probability that the coin you chose was Coin B?

- ☐ a. $3/4$
- ☐ b. none
- ☐ c. $3/5$
- ☐ d. $1/4$
- ☐ e. $1/2$

الصفحة التالية

Question **2**

Not yet answered

Marked out of 3

🚩 Flag question

In 3 independent Bernoulli trials, the probability of success (outcome '1') in any single trial is $p=0.25$. What is the probability of observing exactly one success in these 3 trials?

- ☐ a. $(3 \text{ choose } 1) \cdot (0.25)^2 \cdot (0.75)^1$
- ☐ b. none
- ☐ c. 3×0.25
- ☐ d. $(0.25) \cdot (0.75)^2$
- ☐ e. $(3 \text{ choose } 1) \cdot (0.25)^1 \cdot (0.75)^2$

نظريه احتمالات وإحصاء

Question 3

Not yet answered

Marked out of 3

Flag question

Mobile phone calls involve handoffs (H_0 : zero, H_1 : one, H_2 : >one) and are Long (L) or Brief (B). The joint probabilities are: $P(L, H_0)=0.1$, $P(L, H_1)=0.1$, $P(L, H_2)=0.2$; $P(B, H_0)=0.4$, $P(B, H_1)=0.1$, $P(B, H_2)=0.1$. What is $P[H_0]$ (the probability a randomly selected call makes no handoffs)?

- ☐ a. none
- ☐ b. 0.6
- ☐ c. 0.5
- ☐ d. 0.1
- ☐ e. 0.4

الصفحة التالية

Question 4

Not yet answered

Marked out of 3

🚩 Flag question

Consider an experiment that observes Wi-Fi transmission characteristics. The speed can be high (h), medium (m), or low (l), and the signal length can be for a mouse click (c) or a tweet (t). An observation is a two-letter word representing speed then length (e.g., hm for high-speed mouse click). Which of the following represents the complete sample space S for this experiment?

- ☐ a. none
- ☐ b. $S = \{(h,c), (h,t), (m,c), (m,t), (l,c), (l,t)\}$
- ☐ c. $S = \{hc, mt, lc, ht, mc, lt\}$
- ☐ d. $S = \{h, m, l\} \text{ union } \{c, t\}$
- ☐ e. $S = \{h, m, l, c, t\}$





نظرية احتمالات وإحصاء

Question 5

Not yet answered

Marked out of 3

🚩 Flag question

Consider a language containing 4 distinct letters: A, B, C, D. How many different three-letter words can be formed if each letter can appear only once in each word (i.e., no repetition of letters within a word)?

- ☐ a. 64
- ☐ b. 12
- ☐ c. none
- ☐ d. 24
- ☐ e. 4

الصفحة التالية

Question **6**

Not yet answered

Marked out of 3

Flag question

A basketball player takes two free throws. The probability of making the first free throw is $\frac{1}{2}$. If the first free throw is made, the probability of making the second is $\frac{3}{4}$. If the first free throw is missed, the probability of making the second is $\frac{1}{4}$. What is the probability the player makes both free throws?

- ☐ a. $\frac{1}{2}$
- ☐ b. $\frac{1}{4}$
- ☐ c. $\frac{3}{8}$
- ☐ d. none
- ☐ e. $\frac{1}{8}$

Question 7

Not yet answered

Marked out of 3

Flag question

In a binary code with 5 bits, each bit is a zero with a probability of 0.8, and thus a one with a probability of 0.2. The value of each bit is independent of the other bits. What is the probability of observing the specific code word '10100'?

- ☐ a. $(0.5)^5$
- ☐ b. $(0.2)^2 * (0.8)^3$
- ☐ c. $(0.8)^2 * (0.2)^3$
- ☐ d. none
- ☐ e. $(5 \text{ choose } 2) * (0.2)^2 * (0.8)^3$

[الصفحة التالية](#)

Question **8**

Not yet answered

Marked out of 3

🚩 Flag question

You roll two fair six-sided dice. What is the probability that the sum of the numbers on the two dice is exactly 4?

- ☐ a. $4/36$
- ☐ b. none
- ☐ c. $2/36$
- ☒ d. $3/36$
- ☐ e. $1/36$



Question 9

Not yet answered

Marked out of 3

Flag question

A Starburst package contains 12 individual candy pieces. Each piece is equally likely to be Berry, Orange, Lemon, or Cherry (4 distinct flavors), and the flavor of each piece is independent of the others. What is the probability that a randomly selected package has no Orange pieces?

- ☐ a. none
- ☐ b. $(3/4)^{12}$
- ☐ c. $(1/4)^{12}$
- ☐ d. $1-(1/4)^{12}$
- ☐ e. $(1/2)^{12}$

الصفحة التالية

Quiz navigation



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نظرية احتمالات وإحصاء

Question 10

Not yet answered

Marked out of 3

🚩 Flag question

You are dealt a 3-card hand from a standard 52-card deck. There are 12 face cards (Jack, Queen, King) in the deck. What is the probability that your 3-card hand consists entirely of face cards?

- ☐ a. $(12/52)^3$
- ☐ b. $(12 \text{ choose } 3) / 52^3$
- ☐ c. none
- ☐ d. $(12 \text{ choose } 3) / (52 \text{ choose } 3)$
- ☐ e. $(12 \times 11 \times 10) / (52 \times 51 \times 50)$

الصفحة التالية





Marked out of 3

 Flag question

You are dealt a 3-card hand from a standard 52-card deck. There are 12 face cards (Jack, Queen, King) in the deck. What is the probability that your 3-card hand consists entirely of face cards?

- ☐ a. none
- ☐ b. $(12 \text{ choose } 3) / 52^3$
- ☐ c. $(12 \times 11 \times 10) / (52 \times 51 \times 50)$
- ☐ d. $(12 \text{ choose } 3) / (52 \text{ choose } 3)$
- ☐ e. $(12/52)^3$

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Quiz navigation

Question **2**

Not yet answered

Marked out of 3

 Flag question

Consider an experiment that observes Wi-Fi transmission characteristics. The speed can be high (h), medium (m), or low (l), and the signal length can be for a mouse click (c) or a tweet (t). An observation is a two-letter word representing speed then length (e.g., hm for high-speed mouse click). Which of the following represents the complete sample space S for this experiment?

- ☐ a. none
- ☒ b. $S = \{hc, mt, lc, ht, mc, lt\}$
- ☐ c. $S = \{(h,c), (h,t), (m,c), (m,t), (l,c), (l,t)\}$
- ☐ d. $S = \{h, m, l\} \text{ union } \{c, t\}$
- ☐ e. $S = \{h, m, l, c, t\}$

الصفحة التالية

Question **3**

Not yet answered

Marked out of 3

 Flag question

You roll two fair six-sided dice. What is the probability that the sum of the numbers on the two dice is exactly 4?

- ☐ a. $2/36$
- ☐ b. $1/36$
- ☒ c. $3/36$
- ☐ d. none
- ☐ e. $4/36$

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Quiz navigation



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Marked out of 3

 Flag question

Gerlanda's pizza offers Tuscan (T) and Neapolitan (N) crusts. They also offer mushrooms (M) as a topping. Assuming standard pizza options where a crust type does not inherently exclude a topping, can a pizza be both Neapolitan (N) and have mushrooms (M)?

- ☐ a. No, crust type and toppings are always mutually exclusive.
- ☐ b. Yes, a Neapolitan pizza can typically have mushrooms.
- ☐ c. Yes, but only if it's also Tuscan.
- ☐ d. Only if $P(N \text{ and } M) > 0$ is explicitly stated as true.
- ☐ e. none

الصفحة التالية



نظرية احتمالات وإحصاء

Question 5

Not yet answered

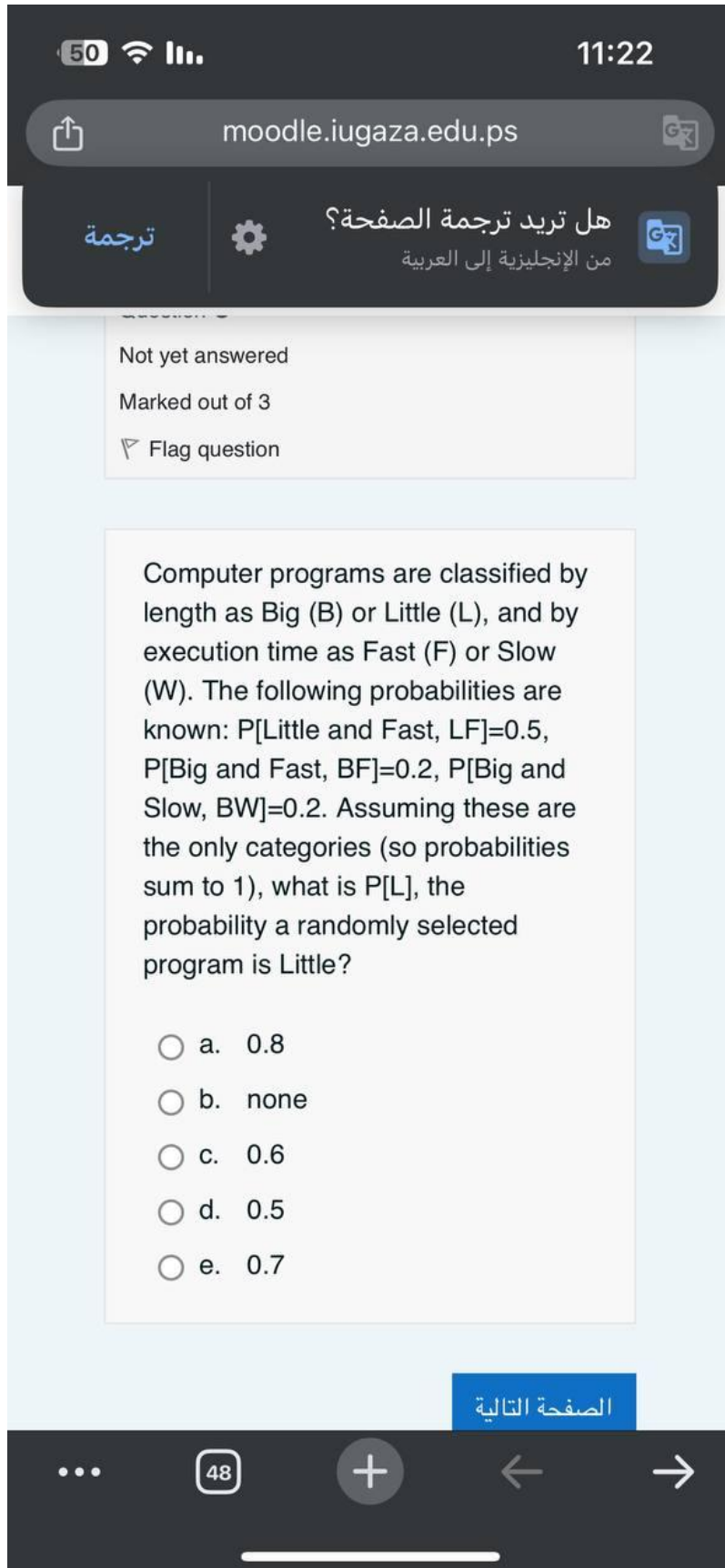
Marked out of 3

 Flag question

You roll a fair six-sided die once.
What is the probability that the roll
results in an odd number?

- ☒ a. $1/2$
- ☐ b. $2/3$
- ☐ c. $1/3$
- ☐ d. none
- ☐ e. $1/6$

الصفحة التالية





Question 7

Not yet answered

Marked out of 3

 Flag question

In an experiment observing Wi-Fi transmission speed (h: high, m: medium, l: low) and signal length (c: mouse click, t: tweet), let A1 be the event "medium speed connection." Which set of outcomes corresponds to event A1?

- ☐ a. $\{(h,m), (m,m), (l,m)\}$
- ☐ b. none
- ☐ c. $\{(m,c), (m,t)\}$
- ☐ d. $\{m\}$
- ☐ e. $\{(m,c)\}$

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Quiz navigation



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Question 8

Not yet answered

Marked out of 3

Flag question

Consider a language containing 4 distinct letters: A, B, C, D. How many different three-letter words can be formed if each letter can appear only once in each word (i.e., no repetition of letters within a word)?

- ☐ a. 12
- ☐ b. 4
- ☐ c. 24
- ☐ d. 64
- ☐ e. none

الصفحة التالية



نظرية احتمالات وإحصاء

Question 9

Not yet answered

Marked out of 3

 Flag question

From a group of 4 distinct people, how many different committees consisting of exactly 2 people can be formed?

- ☐ a. none
- ☐ b. 4
- ☐ c. 12
- ☐ d. 6
- ☐ e. 8

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